

REVISION – DATA AND ALGEBRA MODELLING

1. Express in simplest form:

a. $5a - 11b - 6a + 12b$

b. $a^2 + a$

2. Simplify:

a. $\left(\frac{x^8}{x^4}\right)^2$

b. $\frac{-9m^2}{6m}$

3. Expand and simplify:

a. $12 - (a - 9)$

b. $3(x - 2) - 5(2x - 3)$

4. The volume of a sphere is given by $V = \frac{4}{3}\pi r^3$. If $V = 400 \text{ cm}^3$, calculate r to the nearest millimetre.

5. Solve:

a. $\frac{5y - 2}{3} = 4$

b. $2(p + 1) = 3p - 2$

6. Given that $a = 2.5 \times 10^3$ and $b = 2.4 \times 10^2$, find the value of:

a. \sqrt{ab}

b. $5ab$

c. $\left(\frac{5a}{3b}\right)^2$

7. Complete the table of values for the equation $y = 3x + 2$ and draw the graph of this function.

x	-3	-2	-1	0	1	2	3

8. Graph the following two linear functions on the same number plane and find their point of intersection: $y = x - 1$ and $y = 2x - 3$

9. A car rental company rents a car for \$70 per day plus a distance charge of \$0.20 per kilometre, or for \$120 per day for unlimited distance.

a. Write a linear model for each type of charge

b. Construct a graph for each model on the same set of axis.

c. From your graph, find for what distance the second model (the fixed charge) is cheaper.

10. A survey of family sizes was carried out in a class of 25 students. The following table sets out the results:

Children (x)	Families (f)	fx
1	4	
2	6	
3	7	
4	3	
5	4	
6	1	
$\Sigma f =$		$\Sigma fx =$

Calculate:

- Mean;
 - Median;
 - Mode;
 - Standard deviation
 - IQR
 - Between what two values would 68% of the scores lie, in a normal distribution?
11. Construct a dot plot for the following data, which displays the number of hours a group of 30 students watched a TV program in 1 month.

6 8 8 7 10 6 6 7 8 12
 8 7 6 6 6 9 9 8 6 9
 19 9 6 9 6 8 9 12 20 6

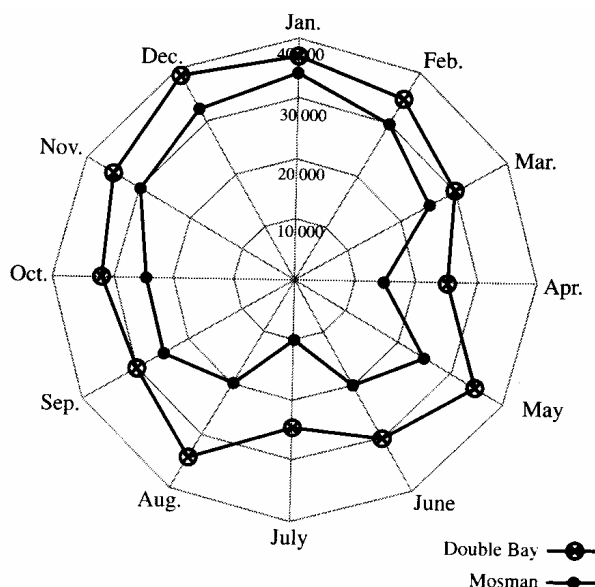
- List any outliers;
 - Describe the skewness of the data
12. The following stem and leaf plot shows the number of dollars spent by a group of 50 tourists, males and females, when having dinner at Sydney's Centrepont tower restaurant.

DOLLARS SPENT	
MALES	FEMALES
8 5 3 3 1	3 4 5 5 6
2 2 1	4 1 2 2 3
6 3 2 1	5 7 7 8
6 5 5	6 5 6 7 7 7 9 9
9 8 7	7 0 3 9 9
5 5 4 4 2	8 2 5 5 7 8

- How many tourists were male?;
- How many were female?;
- How many spent over \$60?;
- How many spent less than \$50?;
- What percentage of the group spent less than \$40?

f. Draw box and whisker plots for the two sets of data.

13. Stacey runs a newsagency at Double Bay and another at Mosman. The monthly sales figures at these newsagencies are shown in the following radar chart:

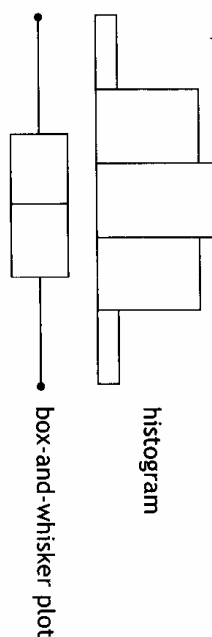


- What were the sales at Double Bay for the month of December?
- What were the sales at Mosman for the month of January?
- In which month(s) did each newsagency have its highest sales?
- In which month(s) did each newsagency have its lowest sales?

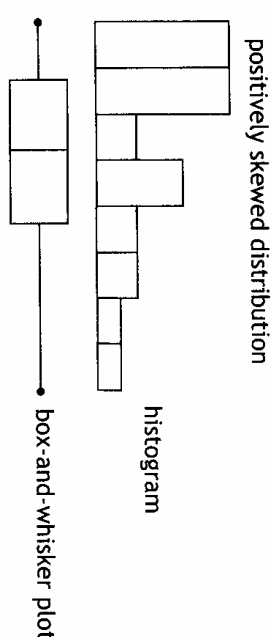
14. In a small country town the ages of the population are normally distributed. The mean age is 38 years and the standard deviation is 12 years. The percentage of the population between the ages of 38 and 62 is closest to:

- A 34% B 47.5% C 68% 95%

The box-and-whisker plot displays the symmetry of the data. If the data are in a **symmetrical** distribution, the median is located in the centre and the whiskers are almost the same length:



If the median is towards the left of the box and there is a long whisker to the right, the distribution is **positively skewed**, as shown below:



If the mean is towards the right of the box and there is a long whisker to the left, the distribution is **negatively skewed**:

